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ABSTRACT

Arguing that computers can help college students make connections between reading and rhetorical theory and research by providing them with opportunities to read reflectively and rhetorically, this paper describes an ideal computer assisted reading component of a composition program. Following a brief introduction, the first section of the paper discusses a major assumption of the component, the idea of the reader as author, and examines four essential roles that a reader plays--planner, composer-drafter, editor, and monitor. The second section explores the idea that reading comprehension is an act of constructing meaning, a notion grounded in schema theory, and that reading is the process of negotiating meaning between a reader and an author through a text. The third section provides the rationale for a computer assisted reading component in the composition program, while the fourth presents a number of activities designed to help readers read reflectively as authors, relating them to the various roles previously delineated. The final section of the paper offers additional applications for the computer assisted component. (FL)

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A COMPUTER-ASSISTED READING COMPONENT FOR READING REFLECTIVELY AND RHETORICALLY IN A COLLEGE COMPOSITION PROGRAM

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Whether or not college and university composition programs that move best with the computer age will be the best in the year 2000 is an empirical question. There is no doubt, though, that computers will change not only how we teach but what we teach. My main point is that computers can help us make connections to the world of reading and rhetorical theory and research by going beyond "word processing" to text and context processing and by helping students read reflectively and rhetorically.

Many would agree with Jill Larkin (1985), Director of the Center for the Design of Educational Computing at Carnegie-Mellon University, that educators stand at the threshold of an exciting age in CAI. Larkin believes this is so because three things have now come together: (1) technology, which makes more powerful, versatile computers at lower cost, (2) infrastructure, the technical and sociological environment in which people both within institutions and within society live, and (3) cognitive science, which has advanced to a stage of sophistication where it understands more about the workings of the human mind. Concerning cognitive science, Jerome Bruner (1984) noted in a speech at the Center for Applied Cognitive Science in Toronto, Canada, that many people are asking questions about how best to equip the mind with the instruments and tools that would aid it in reaching its full power in adapting to the complex environment of our times. They are asking how to get students to go "meta," to go beyond merely knowing about things to reflecting upon them in order to effect correction and self-repair -- in other words, to think

about their thinking in general and their composing processes for writing and reading in particular. A worthwhile approach to using computers as a way of modeling minds, Bruner believes, would be designing a prosthetic device like Computer Assisted Instruction (CAI), which would aid the mind in carrying out a particular operation like going "meta" about reading - that is, becoming a reflective reader.

The Four Selves of Reader as Author: Reading as Composing

Now the reflective reader, or the Meta reader, plays the essential roles of the planner, the composer/drafter, the editor, and the monitor, all interactively and recursively. This is one of the assumptions that undergirds what I consider as an ideal computer assisted reading component of a composition program. The notion that thoughtful readers, like thoughtful authors, are engaged in a composing process and using metacognitive behaviors was recently offered by P. David Pearson and Robert Tierney (1984), who developed a model of the reader as author, shown in Figure 1.

1. Reader as Planner: Planning involves reading behaviors such as setting purposes and goals, generating or activating one's current state of knowledge about the topic, predicting what the author will say or do, focusing on narrower topics or different goals, asking oneself questions that the text might address and aligning oneself with the author. The reader acts in a manner similar to the way that Flower and Hayes suggest authors

begin their texts. The purposes or goals set by a reader may be procedural ("I'll skim over this to get an overview first."), substantive ("I need to find out what caused the Industrial Revolution.") or intentional ("I wonder what this author's purpose, thesis, and rationale are.") or ("I wonder what the significance of this is for me."). Goals are created by readers or are created by authors or teachers and interpreted and accepted, or not accepted by readers. Goals can be embedded in one another, mutually supportive, or conflicting.

Planning also involves accessing the right prior knowledge (i.e., the amount of appropriate information , the level of appropriate specificity, and the timeliness of the information [the right information at the right time]). What teachers and researchers find generally is that most students read a text once and rarely consider what they already know as they develop plans for dealing with the topic addressed in a text or with the genre and author's procedural plans. Accessing one's prior knowledge about the topic and discourse is necessary in order to predict what the author will say or do. Predicting should happen before the reader reads the text and at various junctures throughout the reading of the text.

Another aspect of planning is the alignment of the reader with the author. Readers can decide to align themselves with an author, taking the author's point of view, identifying with the author, a character or an idea, or they can decide to remain

aloof from the author or resist the author. Alignment influences the model of meaning a reader is able to construct from the cues provided by the author.

In order to implement the planning aspect of the reader as author model, readers must understand a wide range of possible author intentions, plans, purposes, or goals and contexts. As Bertram Bruce (1981) points out, failure to recognize author's plans can interfere with finding a thesis, main idea, or identifying an author's persona, tone, or point of view. A deep understanding of a text requires plan recognition by the reader, that is, recognition of the author's intentions and procedural plans for constructing the text. It requires also a knowledge of the constraints an author must work within, based on the context of the situation. We might call these meta-plans. A text constructed as a textbook has a very different situational context and set of constraints than does a "how to" book about remodeling houses. It means, in addition, that readers must understand a wide range of possible reader intentions and procedural plans, and effects of situational contexts on readers, texts, and authors. The notions of reading as negotiated meaning, rhetorical act, and social interaction recognizes that mutuality and collaboration between author and reader are essential, but that at certain times, in certain contexts, the role of the author will be dominant and at other times the role of the reader or the role of the text will be dominant (Abrams, 1953).

2. Reader as Composer: Reflective readers view the text on the page as only one of many resources available for constructing their own text; other resources include the reader's current assessment of what is already known, the goals accepted for reading the text, and the predictions made and questions asked of the text. The text is a blueprint of meaning - readers must create their model of meaning. The model of meaning is driven by a quest for coherence - a striving to make things fit. Ideas must fit with predictions, and each text segment must fit with preceding and succeeding ones. To achieve that fit, readers fill in gaps with inferences, revise their working models of meaning, refine or redefine purposes or ignore data from the text blueprint in order to maintain their model. Homeostasis and equilibrium are the goals of model building.

3. Reader as Editor: A completely constructed text requires not only planning and composing, but also editing. When a model of meaning is created--one that fits--editing begins. Sometimes a model needs a complete overhaul, sometimes fine tuning. Readers need to approach a text with the same deliberation, time, and reflection that a good author uses when revising a text: They need to develop control over their models of meaning. Their reading must be considered a first draft and subject to revision as developing interpretations are examined. Rereading, annotating the text on the page with reactions, comments, and questions are behaviors that thoughtful readers find essential for the desired constructed text. The notion that readers should

approach the text as a master author who carefully crafts a text, the notion that readers should craft an understanding across several drafts, several readings, and the notion that thoughtful readers pause, rethink, and revise are notions foreign to most student readers, however.

4. Reader as Monitor: The monitor is an executive who examines the balance of power among planner, composer, and editor. The monitor can decide at any point during the reading to call up the editor to rethink or the planner to activate a different knowledge structure, to make a different alignment with the author, to set different goals, or to tell the composer to give extra weight to some other feature of the text blueprint. The monitor decides which role should be dominant at any point and decides when a text is "ready."

Constructing Texts as Rhetorical Act and Social Interaction

Other assumptions underlying the ideal computer-assisted reading component are that reading comprehension is an act of constructing meaning, a notion that is grounded in schema theory (Spiro, 1977 & Anderson, 1977) and that reading is the process of negotiating meaning between a reader and an author through the medium of a text. This text may be either verbal or non-verbal, since texts can consist of different sign systems. Authors construct their texts intending that readers construct their own text but expecting readers to create a meaning that bears some resemblance to the meaning they had in mind when they wrote the

text. Authors also expect some variation and expect readers to fill in certain gaps in their writing. Texts are read by readers who expect that authors have been as considerate as possible in constructing their texts by providing enough clues about the meaning of a text to make it possible for readers to reconstruct the entire message in a model that closely resembles the model the authors had in mind when they wrote it. Both authors and readers in their constructing are performing a rhetorical, communicative act, since every written utterance is an act, every attempt to understand a written utterance is an act, and authors and readers attempt to have an effect on each other. Every rhetorical act is a social process and a social construction. Such a perspective implies that knowing <u>why</u> an author said something is as important in interpreting and constructing texts as in knowing <u>what</u> was said and how it was said. It also implies that knowing the interpretive communities the author and reader belong to and the context in which the message was written is important.

I would now like to share some of my thoughts about what an ideal computer assisted reading (CAR) component in a college or university writing program would look like - this hypothetical world in which reading, writing, and rhetoric are integrated and students engage in "meta" activities as they reflect on the strategies needed to read like a writer and read like a rhetor. I will first explore the reasons why a writing program might wish to include a computer assisted reading (CAR) component, and then offer suggestions for going beyond word processing by developing

CAR tutorial exercises that (1) make use of a wide range of texts, (2) focus on helping students learn to become reflective "meta" readers, (3) help students identify an author's rhetorical purposes, strategies, and devices, and (4) help students apply similar strategies and devices for the same or different purposes for their own composing.

Rationale for a CAR Component

Many students who come to composition programs have failed to learn from the traditional curriculum where print material is the dominant means of instruction. As many have pointed out (Cloeman, 1966; Clamp, 1983; Tansley & Panckhurst, 1981), a program for underprepared students needs to possess the following four essential components: (1) individualized instruction, (2) multisensory stimulation, (3) immediate feedback and positive reinforcement, (4) student control of environment. CAI fills the need for the above missing components in a composition program, providing a promising alternative to all students underprepared in reading reflectively and rhetorically.

After years of collaborative efforts by English teachers and instructional technologists, computer-assisted writing has come to be recognized as a potentially valuable medium for composition teaching. Although methodologically sound research studies in assessing its effectiveness are yet to be found, a reasonable wealth of past and on-going endeavors have reported positive outcomes from computer-supported writing environments (Bean, 1983;

Bishop, 1972; Boyd, Keller and Kenner, 1982; Bradley, 1982: Burns and Culp, 1980; Kleiman and Humphrey, 1982; Miller and Drager, 1979; Rubenstein and Rollins, 1978). At present, however, as far as is known, no attempts have been made by college or university English Departments to provide a computer-supported reading environment for students. It is certainly naive to suppose that microcomputer-based instruction is the stlution to the multifaceted reading problems students might have, and to suppose that a reduction in instructor-student interaction and instructor involvement with assessment are not real concerns. However, it is still reasonable to believe this electronic medium is a powerful tool for providing enriched opportunities for students to go "meta" and become reflective readers.

A prosthetic device like a CAI tutorial can aid the use of the reader's mind in carrying out the particular operations needed for planning, composing, editing or monitoring. As we mentioned earlier, new developments are making possible more powerful and versatile computers asnd microcomputers. Among these are systems that will display an entire page on a screen, will permit multi-tasking, in which the computer does several jobs at once; and will have virtual memory, permitting disk storage when the machine runs out of memory. As Larkin has pointed out (1985), "...traditional instruction is not enough for many students. If we stick to lectures and labs, lots of students never get it. Computers can help in many of these situations. Beginners are often inefficient and prone to error in

solving complex problems (like reading), but often can be prompted through the problem if a tutor (or rhetor) sits alongside, laying out guidelines or rules for each situation. Sometimes connections between concepts and ideas and prior knowledge aren't made because students are applying rules with extreme rigidity; other times they are meandering and unfocused, bringing in irrelevant information. Computers can give students immediate feedback, pointing out to the individual student that in this particular context what he/she is attempting to do does not make sense. The computer tutor is not rigid," according to Larkin. "It's an expert that shows you that there can be many sensible ways to solve a problem. It gives the student a boost, saying 'Here's what I would do in this situation.' It intervenes as soon as there is a problem and can model problem-solving strategies." indispensable

Computer-supported environments at Brown University, for instance, make use of the computer's capability for illustrations, animation, and a variety of related information and commentary, shown in different windows on the screen. Arthur Van Dam of Brown University (1985) states that students using the computer see animated processes and explanations of things that are intrinsically dynamic. With computers they can create new models of physical and abstract bodies in three dimensions and in color. Three-D models on the screen allow life-science students to "walk around the brain or through the human body."

With a little imagination, one can see how CAI tutorial programs through a running commentary (a glossing of the text shown in different windows on the screen), prompts, and feedback on solutions to problems and tasks based on the text might help students in a composition program. Students could be helped to (1) make connections between writing and reading concepts and ideas, (2) apply rules in context-specific situations, (3) identify errors and make self-repairs in reading, and (4) perhaps even walk through colored, dynamic, three-D models of the composing process for reading and writing of a constructed, rhetorical text.

Computer assisted instruction (CAI) is effective and widely used in general, although some of the widely used programs are not effective for various reasons. One of the problems is courseware. Creating courseware takes time, the rewards are not great, and the channels for distributing software are not available. Quality software, like quality textbooks, does not happen if use is restricted to just one course at a university - a wide dissemination is necessary. Another problem is faculty interest, but this solution will come when faculty finds it better, easier, and more rewarding to teach a course with computers than without. A third problem concerns students and their individual differences. We can teach some students better with the help of CAI; we can't teach all of them. With certain students, enthusiastic teachers, other students and quality textbooks work but not CAI. A final problem is that tutor feedback is also a constructed text

with a persona, author/reader alignment and a message that readers must construct in addition to the other text being read.

Let us assume in a hypothetical world that we have microcomputers with audio, color, graphics, and three-dimension capabilities and that they are in adequate supply and are easily accessible for students and instructors. Let us assume, too, that we have the potential for developing quality coursework: that composition faculty have the time, know a powerful authoring language, and have adequate rewards for developing CAI coursework or have access to CAI practicum students who know it and who have been assigned to them by CAI faculty to gain experience. We will also assume that faculty interest in using CAI is high, and that all our students can somehow benefit from CAI. Why would we want a computer-assisted <u>reading</u> component?

Recent writing and reading research has addressed processes, developmental features, assessment, analysis of the products and classroom procedures in instruction, among other things. A thread which seems to run through all these concerns is the view of both writing and reading as composing. This raises expectations about the importance of writing for reading and reading for writing. This importance may be viewed from two angles: (1) the composing process involves the writing and reading of a wide range of texts as well as concern with the reader/author; and (2) the composing process, when applied, results in products. It seems reasonable to expect, therefore, that insights into or

experiences with the process of composing should influence the attempt of students to process a text for meaning. This is not to say that writing and reading are identical, but there are at least some connections which invite as reasonable the expectation that computer-assisted instruction in reading as composing and consideration of constructing texts as rhetorical acts with various writer/reader relationships possible should have benefits for novice authors in a composition program - that is, their performance in writing and reading, as well as their attitudes toward writing and reading, should improve.

By offering on-line tutorial help that provides commenting, modeling, prompting and information about planning, composing, editing and monitoring, the computer can help us convey convincingly to students the idea that reading as well as writing is a composing process. Moreover, computers can enhance teaching effectiveness. Given the fact that many students need multiple exposures to the presented reading materials and that, typically, available class time for reading activities does not exist or is often severely limited, we can assign out-of-class reading activities and accurately and effortlessly monitor student progress with the computer. We can obtain statistical information that diagnoses every student's reading performance in precisely defined learning objectives and that recommends prescriptive activities to remedy inadequate learning (Coulson, 1981). Such data are indispensible in helping us to make informed decisions as to placement, group-paced instruction, and individually-

tailored remediation and in helping us carry out research.

PROJECTED CAR ACTIVITIES TO HELP READERS READ REFLECTIVELY AS AN AUTHOR

Applying the Composing Process to Reading

The potential of computer applications for a reading component is not as much limited by the inadequacy of the computer's "intelligence" as by the creativity of the instructor/programmer and range of reading materials available to the student. An ideal CAR component requires a wide range of reading texts available on the computer.

The Range of Texts: Ideally, the range of reading texts would at least include the texts presented in Table 1. Additional ideas can be gleaned from Figure 2, A General Model of Written Discourse, which was developed for the International Educational Achievement IEA) writing project.

The ideal situation is to design CAI programs that simulate a wide variety of rhetorical situations where authors and readers must play different roles, shift perspectives and shift alignments with each other. The reader's task is to engage in metareading as he or she solves rhetorical reading problems as the planner, composer, editor, or monitor. The following CAI activities should promote this problem solving and help readers construct better texts as they build better models of author's constructed texts.

-- Predicting in prose or a visual display what the author will say or do do in a text or what might happen - message, structure and strategies.

-- Answering questions about the reader's purpose for reading.

-- Answering questions that ask the reader to activate prior knowledge in order to simplify the upcoming reading task (i.e., what do I already know about the context, author's purpose, topic or genre that will help me understand this text?). The questions would help the reader develop hypotheses and guesses.

-- Making marginal notes about a familiar topic, context or genre. (Having mental debates with the author and making a running commentary, i.e., assuming a critical stance.)

-- Making marginal notes for an unfamiliar topic that summarize, paraphrase or highlight information in the text (or for an unfamiliar context, purpose, genre, etc.).

-- Setting the purpose to get inside the author's head in order to evaluate the text from the author's point of view (suspending judgment and relying on the <u>author's</u> ideas, rather than the <u>reader's</u> prior knowledge - assuming an uncritical stance).

-- Setting the purpose to read in order to determine the various rhetorical devices the author has used in attempting to

accomplish purposes and goals as author (reading to identify the variation in forms used to achieve different functions).

These activities should help readers perceive reading as imposing a minimum rather than a maximum load on new learning. They will gain a better perspective on reading purposes and integrate knowledge rather than compartmentalizing it in order to learn or memorize for a test and then forget it! The activities should also encourage self-diagnosis to allow for allocating differentially the attention and cognitive energy needed to constitute good mental texts.

Reader as Editor

It is necessary to design activities that help readers understand and reflect about the dynamic interplay between author, text, and reader prior knowledge at all points throughout the composing process for reading. For instance, it is important for readers to understand that in order to realize one's ability to assume an editorial stance is a function of prior knowledge. It is easy to play the role of editor with a familiar topic (context, purpose, genre) but not so easy when the topic is unfamiliar.

-- Playing the role of editor-for-the-author (What is the author trying to say and how can I help him say it better? Here the author is trying to create a somber mood to con-

vince us that nuclear weapons should be banned. How could the author have done a better job of creating that mood and convincing us of the point?).

-- Role playing where the reader is instructed to play the role of the editor at a rewrite desk. The reader must take the carelessly written, phoned-in news story of reporters and edit them by deleting irrelevant sentences. If essential sentences are deleted, students are provided with tutorial feedback and asked to try again.

-- Playing the game of "Suspect Words or Sentences." The acting involves local networking with two teams. One team of two readers is given a text by a famous author and asked to substitute some key words or insert a sentence or two into the text. The other team must find the suspect words or sentences. The activity promotes keen attention to authorship and stylistic features that each team must attend to in selecting, creating, and deleting bogus words or sentences. Computers make it easy to insert, delete or rearrange.

-- Rewriting texts (e.g., composition textbooks) when they are confusing and inconsiderate or for different purposes and readers.

-- Answering questions about why the author chose to say what he/she did this way instead of choosing one of the very

large number of alternatives.

-- Answering questions about figurative language used in texts (What would a literal paraphrase be? How does the set of overtones the figurative language carries with it represent the author's attempts to color my attitude toward the topic described by the figurative language?).

-- Understanding: (1) the two meanings of fact, (2) the dimensions of factuality on a continuum of opinion to fact, and (3) how fact and opinion covary with each other.

-- Evaluating opinions and author attitudes toward the topic and the text (probably, certainly, fortunately, etc.).

-- Identifying indices of idealogies, attitudes, beliefs of authors and publishers signified by the choices made for the presentation of the content (e.g., the lack of the personal pronoun I and the lack of hedges in a history textbook). The belief that students learn better with impersonal voice and all history is fact.

Reader as Monitor

-- Designing a general plan of attack for reading text X in stipulated contexts with stipulated purposes (a problem-solving task).

-- Designing a set of self-checking questions for reading strategies... when to use them, which is appropriate for

which situation for the planning, composing, editing stages, etc.

-- Designing a model of the reading as a writer process showing the monitor in relation to the planner, composer, and editor.

These reading activities can be designed as graduated prompts. A question is asked with no help from the tutor at first. If the reader gives an incorrect answer, a series of hints and modeling clues are given to help the reader with the correct answer or behavior. This method of prompting is based on Vygotsky's notion of the zone of proximal development and of significant other (the tutor, who models behaviors) discussed by Brown and French (1980). The prompts can just be displayed visually on the computer screen or can be displayed along with an oral presentation on an audio device.

Three-D simulation can be used for text contexts and texts. Computers and videodiscs can be used for simulation, problem-solving, and game approaches. Multi-tasks, multi-windows, and graphic capabilities increase potential benefits of a CAR component. Activities for assessing the mental state of readers reading certain kinds of texts can also be useful (e.g., a comfort index for reading composition textbooks), as well as preference ratings of readers for certain texts. The affective domain is as important as the cognitive domain in an ideal CAR component.

OTHER PROJECTED APPLICATIONS FOR THE CAR COMPONENT

Rhetorical Analysis of Writing Models

Studies on writing have stablished a definite connection between critical reading skills and writing competence (Anandam, Eisel & Kotler, 1980). Students need to develop keen perceptions of the rhetorical strategies employed in good writing models and then transfer them to their own writing. Again, the computer can be a very good tutor in helping such development.

Students would be helped to identify what I call informational metadiscourse. Informational metadiscourse includes statements about the author's purpose or goal, and justification or rationale. They would also be asked to identify such rhetorical devices as previews and summaries, topic shifts, emphasizers, hedges, continuers, connectors, and other signposts on both global and local levels.

In addition, they would recognize and use what I call attitudinal metadiscourse. Attitudinal metadiscourse includes the rhetorical strategies writers use to indicate their point of view and attitude toward the subject matter and readers, such as sentence adjuncts and the grammatical persons (first, second, third) and other devices that index distance. Finally, they would learn to identify the direct rhetorical techniques of labeling the discourse type or speech act, describing the plan of the paper, and commenting on the presentation of the content or discourse.

A useful heuristic framework for the rhetorical/stylistic study of prose is Rygiel's (1978) holistic, flexible, and generative framework - a paradigm with a set of seven interrelated questions. The seven primary questions are to be answered for each text presented on the computer or assigned as additional reading. The additional questions and categories are intended to help the student answer the seven primary rhetorical/stylistic questions. The complete framework is shown in Table 2.

1. What is the rhetorical situation which led to this work?

2. What is the author's primary purpose, and are there important subsidiary purposes?

3. What is rhetorically significant about the context?

4. How does the organization contribute to the effectiveness of the text?

5. How does the author's persona contribute to the effectiveness of the text?

6. How does the author's tone contribute to the effectiveness of the text?

7. How does the style contribute to the effectiveness of the text?

On-line Analysis of Text Structure with Visual Displays

Disorganized essay or paragraph straucture is one of the major causes of inconsiderate, poorly written text. Students need help in identifying and organizing or reorganizing the major components of a text, as well as the hierarchical relationship between major and minor supports within the body development. Graphic representation of the text structure is a common means to help the student visualize its componential or hierarchical relation. This strategy can easily be transformed onto the computer at two levels of identification.

At the identification level, the student is given a text (either an essay or a paragraph) on the computer to analyze. The computer judges the student's analysis and explains why it is correct or incorrect according to predetermined criteria. Then the computer rearranges the text into a graphic representation to illustrate both correct and incorrect analyses, as seen in Figure 3.

Finally, the computer prints out a hard copy of both the original text and the structural visual displays for review at home.

-- Since revision is very easy on the computer, such on-line structural analysis can be done at the planning stage (producing a preliminary outline), the composing stage (producing a formal outline), and the editing stage (producing a revised outline).

-- By counting the number of structural components present,

the computer can generate both on-line and off-line graphs with the corresponding number of boxes in which the components are enclosed. Conventional analysis sheets are static and do not allow this kind of flexibility.

To illustrate, suppose the student reads a text about the topic of "fame." Given the parameters of the rhetorical situation such as discourse mode, audience, and style, the computer asks a series of questions that aim at directing the student's attention to some possible routes to explore the topic in order to arrive at a thesis statement.

Heuristic Strategies for Discovering a Thesis

Although the present state of artificial intelligence is still primitive in responding to natural language and analyzing the logic and content of student input with differentiated feedback to students, we can avoid the problem by imposing some kind of contextual constraints on the anticipated student input (Martin, 1973). There are at least two approaches for realizing this end without sacrificing genuine human/machine interaction: the thesis-specific heuristic approach and the thesis-shaping heuristic approach.

Thesis-specific Heuristic Approach

The premise of this approach is that the exact thesis of a text has been supplied by the teacher and assigned on the computer. The program helps the student define the rhetorical

situation and explore the thesis topic by asking heuristic questions concerning the thesis. For example, given the thesis, "Grades should (not) be abolished," the student can be prompted to answer questions regarding the audience, purpose, style, and major pro and con arguments. Student answers are the matched against a preprogrammed list of possible answers through a sophisticated "answer judging algorithm" and appropriate feedback provided to comment on the rhetorical quality of the student's thinking, and to gain suggested revisions/rereadings of the text.

Thesis-shaping Heuristic Approach

This approach is based on the premise that the student starts with a broad, teacher-supplied topic for a text, and the student's task is to read in order to narrow the topic down to a specific, well-defined, workable thesis statement. The program leads the student through such thesis-shaping process by prompting a series of student-computer dialogues that simulate teacher-student collaboration in thesis identification.

To illustrate, suppose the student reads a text about the topic of "fame." Given the parameters of the rhetorical situation such as discourse mode, audience, and style, the computer asks a series of questions that aim at directing the student's attention to some possible routes to explore the topic in order to arrive at a thesis statement.

Because of the broad scope of the topic and the unpredictability of the student input, such a program is deemed to be less

capable of providing analytical and meaningful feedback to the student than the previous thesis-specific program. However, with sound instructional design, the program can still serve its purpose well.

Utility and Coherence

Paper-and-pencil exercises that aim at understanding text unity and coherence have generally suffered from the lack of detailed explanatory feedback to individual responses. Teachers often find it extremely time-consuming to explain to individual students why one sentence/paragraph breaks text unity or coherence (resulting in inconsiderate text) and why others do not. Computerized exercises on text unity and coherence serve exactly this need for individualized explanatory feedback.

For an exercise on unity, the computer first presents a text with some sentences or paragraphs that depart from the thesis of the text and thus break unity. The student is then asked to judge the relevance of each sentence or paragraph to the text. For each incorrect answer, the computer can serve as a patient tutor, explaining why the answer needs reconsideration. After going through the entire text and identifying all the irrelevant sentences and paragraphs, the computer will delete those sentences or paragraphs, reformat the text, and print out a well-unified text on paper for the student to study at home.

An alternative approach would be to delay answer judging until much later. The student first goes through the whole paragraph, identifying all the irrelevant sentences. Then the computer reformats the paragraph according to the student's wishes, giving the student a fresh look at the newly constructed paragraph to examine its unity. The student can repeat the process for as many times as needed until he/she has made the final decision. Only then does the computer judge the student-revised text against the teacher-revised version(s) stored in the computer memory. Mistakes are identified and explained. The student then goes through the text again, making the suggested revisions until text unity is finally achieved.

For an exercise on text coherence, the strategy remains much the same. First, the student is given a list of scrambled sentences or paragraphs. The student is then assigned the task of numbering them in a coherent order. The computer rearranges the sentences or paragraphs to the student's specified order into a text form. Examining the newly formatted text, the student decides whether it is coherent or further change is needed. After the final decision has been made, the computer judges it, and explains why text coherence has or has not been achieved. The student makes final revisions and receives a printout copy of the coherent text.

Transition Signal Words

Using the unique capabilities of the computer, we can develop a CAI lesson on understanding transitions and signal words far superior to traditional paper-and-pencil approaches. The lesson first presents a short discussion of the different categories of transition words showing similarity, emphasis, cause and effect, etc. To help the student comprehend the contrasting meaning of each transition word in a larger context such as a paragraph, the computer presents the student with a leading sentence from a text, letting the student control the logical flow of the rest of the paragraph by selecting different transitions.

To illustrate, suppose the leading sentence is "Snack foods are usually worthless for our health." The student is then given an option to choose from two or three transition words of contrasting functions, such as "In fact" and "However." By choosing the first one, the student will see a following sentence that "elaborates" on the preceding sentence. By choosing the second, the student will see a completely contrasting sentence that "contradicts" the preceding one. This process is repeated until the student comes to the end of the paragraph.

Such a lesson does not directly tap the student's competency to use the appropriate transition, but simple alerts the student to the effect of different transitions on logical development. In order to assess how well the lesson has accomplished this goal, we can then generate an exercise in which the student is

asked to select or supply an appropriate transition word that links a series of sentences in a logical manner. Or alternatively, the leading sentence is given, together with a transition word followed by two sentences. The student is to choose the one that logically follows the previous sentence.

Gradual Editorial Help with Minimal Marking

Incorporating Haswell's (1983) "minimal marking" strategy into our CAR component could develop an error detection program that, instead of identifying all errors and suggesting revisions, offers a four-stage help approach to each text. The first time around, the computer raises a flag beside the line where a reading problem lies. If the student cannot locate the problem, and revise the text, the second time around it identifies the problem area by flashing, underlining or other techniques. If the student still cannot locate it, the third time it indicates the category of reading problem. Only after all these fail does the computer present the desired revision.

MORE USEFUL C A R APPLICATIONS

Automated Error Analysis

Manually tabulating an error analysis inventory for each student paper has been a nuisance. Despite its proven benefits in pointing out the student's major areas of weaknesses in reading (Anandam, Eisel and Kotler, 1980), very few teachers have made use of the technique of error analysis. By adding a

subroutine program to the main program mentioned above, we can effortlessly receive a computer-generated error analysis report for each student's text reading.

Another related application is to connect the error analysis subroutine to a data bank which stores all handout materials and exercises for reading. Upon identifying the major weaknesses as described on the error analysis sheet, the computer simultaneously prints out the file numbers of the prescribed exercises for practice and remediation, a tremendous help for those instructors who have never had time to familiarize themselves with the huge file system of existing prescriptive materials for reading.

Local Networking/Electronic Mail Systems

It has been found that students sometimes prefer working in a private environment in which they are free to receive and offer feedback on their own text interpretations or somebody else's. At present, peer consultation is normally done in a classroom situation in which students evaluate each other's interpretations. Experience has shown that in such an open environment it is difficult to avoid unintentional embarrassment to the students who perceive themselves as poor readers and who cannot stand being exposed to public criticism. Local networking through which students or the teacher give comments on somebody else's interpretation of a text on the computer provides exactly the security needed for both the reader and the commentator. Such conferencing and peer consultation with electronic mail systems

has proved productive in facilitating the composing process for reading and gives more opportunities for teacher-student interaction. Another possible use of the microcomputer is to display the reading test (RFU) and have students answer the items on the microcomputer itself. Records of student answers and reading times per item would be valuable diagnostic information.

The above sketched applications of microcomputer-assisted reading are by no means exhaustive. A lot more can be added to the list as the program expands. Some of the applications can be implemented without much technical support from outside resources, others may require substantial outside support, both technical and financial.

REFERENCES

Abrams, M. (1953). The mirror and the lamp: Romantic theory and the critical tradition. New York: Oxford University Press.

Anandam, K., Eisel, E., and Kotler, L. (1980). Effectiveness of a computer-based feedback system for writing. Journal of computer-based instruction, 16 (4), 125-133.

Anderson, R. (1977). The notion of schemata and the educational enterprise: General discussion of the conference. In R. Spiro, B. Bruce, and W. Brewer (Eds.), Theoretical issues in reading comprehension. Hillsdale, NJ: Erlbaum, 313-350.

Bean, J. C. (1983). Computerized word-processing as an aid to

revision. College composition and communication, 34 (2), 146-148.

Bishop, R. (1972). Journalism: A program to provide assistance in the analysis of newspaper writing. in W. K. Davis, et al. (Eds.), xxxxxxxxxxxxxxxxxx xxxxxxxxxxxxx.

Blanchard, J. (1984). U. S. armed services computer assisted literacy efforts. Journal of reading, December, 262-265.

Boyd, G., Keller, A. and Kenner, R. (1982). Remedial and second language teaching using computer-assisted learning. Computers and education, 6 (1), 105-112.

Bradley, V. N. (1982). Improving students' writing with microcomputers. Language arts 59 (7), 32-38.

Brown, A. and French, L. (1979). The zone of potential development: Implications for intelligence testing in the year 2000. Urbana: Center for the Study of Reading, University of Illinois. Tech. Rep. No. 128, May.

Bruner, J. (1984). Notes on the cognitive revolution. Interchange 15/3, The Ontario Institute for Studies in Education, 1-8.

Bruce, B. (1981). A social interaction model of reading. Discourse Processes, 14, 273-311.

Burns, H. L. and Culp, G. H. (1980). Stimulating invention in English

composition through computer-assisted instruction. Educational technology, 20(8), 5-10.

Clamp, S. J. (1983). Computer assisted learning and the less able. Remedial Education, 18 (12), 15-18.

Coe, R. (1981). Individualized revision heuristics and other techniques for teaching revision. Conference on College Composition and Communication, Dallas.

Coleman, J. S. et al. (1966). Equality of educational opportunity. Washington, D. C.: U. S. Government Printing Office.

Coulson, J. E. (1971). Computer-assisted instructional management for teachers. AV Communication Review, 19 (2), 161-168.

Haswell, R. H. (1983). Minimal marking. College English, 45, 600-604.

Kleiman, G. and Humphrey, M. (1982). Word-processing in the classroom. Compute, 22, 96-99.

Larkin, J. (1985). Chancellor's conference considers computers. Illiniweek, 4/22, March 7.

Martin, J. (1973). Design of man-machine dialogues. Englewood Cliffs, NJ: Prentice Hall.

McConkie, G. (1982). A computer assisted reading (CAR) study at Sheridan correctional center. Unpublished paper. University

of Illinois.

Miller, C. L. and Drager, L. B. (1979). Authoring for computer-based training. NSPI Journal, 19, 13-17.

Pearson, P. and Tierney, R. D. (1984). On becoming a thoughtful reader: Learning to read like a writer. In A. Purves and O. Niles (Eds.), Becoming readers in a complex society 1984. Chicago, IL: The national society for the study of education, 144-173.

Rubenstein, R. and Rollins, A. (1978). A demonstration of the use of computer-assisted instruction with handicapped children: Final report. Cambridge, MA: Bolt, Beranek and Newman.

Rygiel, D. (1978) A framework for the rhetorical/stylistic study of nonfictional prose. Conference on College Composition and Communication, Minneapolis.

Spiro, R. (1977). Constructive processes in prose comprehension and recall. In R. Spiro, B. Bruse and W. Brewer (Eds.), Theoretical issues in reading comprehension. Hillsdale, NJ: Erlbaum, 245-278.

Tansley, P. and Panckhurst, J. (1981). Children with specific learning difficulties. London: Nelson.

Van Dam, A. (1985). Van Dam describes Brown's intellectual experiment. Illiniweek, 4/22, March 7.

Wang, L. and Crismore, A. (1984). Proposal to conduct research on the integration of microcomputers and the EOP rhetoric program at the University of Illinois. Unpublished paper, University of Illinois.

Table 1

A Range of Texts Essential for Computer-assisted Reading

-- different versions of a short text

-- different genre used for the same topic or purpose

-- professionally written (different cultures represented)

-- student written (different cultures represented) (peers)

-- instructor written

-- academic

-- non-academic

-- situated (more constrained texts such as textbooks, professional/technical texts)

-- unsituated (less constrained texts such as "how to Reduce," personal letters)

-- fiction, poetry, drama, TV scripts

-- Non-fiction (essays, articles, biographies, research reports)

-- speeches

-- texts (essay, objective)

-- style manuals (APA, MLA, etc.)

-- newspapers (campus, community, urban, English, foreign)

-- children's trade books, textbooks

-- inspirational (Bible, Dale Carnegie)

-- historical documents

-- summaries, abstracts, paraphrases, plan sheets

-- outlines

-- visual displays (quantitative, qualitative, verbal, models, process, etc.)

-- in progress texts

— final drafts

-- textbooks (composition, reading, content area)

-- whole texts (long, short)

-- excerpts (long, short)

-- Meta-texts <u>about</u> rhetoric (classic/modern), composition, reading

Table 2

A Framework for the Rhetorical/Stylistic Study of Nonfictional Prose

(Rygiel, 1978)

I. What is the rhetorical situation which led to this work?

What should one know about the contexts in order to understand and judge the work?

Date written/published

Form of publication

Place of publication

Biographical context

Historical context

Cultural context

Literary context (especially genre)

Linguistic context (especially relevant norms - period, dialect, subject matter, medium, formality)

In particular, to what specific audience is the work directed?

II. What is the author's primary purpose, and are there important subsidiary purposes?

Specify the purpose(s) as precisely as possible, taking into account the specific audience to which the work is directed.

Classify the work in terms of aims of discourse (referential, persuasive, expressive, literary).

III. What is rhetorically significant about the content?

What kind of material is primarily involved

personal observations	reflections/meditations
feelings	opinions/beliefs
facts	generalizations, inferences

arguments theories

How does the subject matter stand in relation to the audience, specifically in terms of similarity, acceptability, interest, and importance?

What are the key ideas/themes/theses and/or arguments/persuasive appeals?

Appeals to reason

Where such appeals occur

Kinds

Testimony (authority, testimonial, statistics, maxims, law)

Logic topics

description definition division into parts

classification comparison exemplification

analogy narration process

induction iteration cause and effect

negation alternation syllogistic progression

Arguments that seem logical, but are not, i.e., fallacies

faulty analogy false cause begging the question

Overall logical validity/sufficiency and rhetorical effectiveness

familiarity acceptability importance

sufficiency to audience

Appeals to emotion

where such appeals occur

forms the appeals take

emotions appealed to

overall relevancy/legitimacy and rhetorical effectiveness

familiarity acceptability

importance appropriateness to audience

IV. How does the organization contribute to the effectiveness of the work?

What is the immediate sequential structure of the whole work, i.e., the kind of structure revealed by outlining?

Is the structure essentially a logical one?

How tight or loose is the structure?

Is the whole organized according to a single pattern of development?

description	definition	division into parts
classification	comparison	exemplification
analogy	narration	process
induction	iteration	cause and effect
negation	alternation	syllogistic progression
association		

V. Are significant parts organized according to one or more of the patterns of development?

How does the logical structure relate to the purpose(s) of the work?

Is the overall sequential structure rhetorically motivated in any way?

from familiar to unfamiliar simple to complex

less important to more important

What is the rhetorical function of each major part?

How do they relate to the purpose(s) of the work?

What is rhetoricaly significant about paragraph structure when paragraphs are considered as expanded sentences, as self-contained units or as subdivisions of the whole?

VI. How does the author's persona contribute to the effectiveness of the work?

What is the author's implied characterization of himself or herself?

How fully developed is this characterization?

How does the characterization relate to the purpose(s) of the work?

How important is the characterization to the work's success?

How does the author's tone contribute to the effectiveness of the work?

What is the author's attitude toward the subject?

confident	judicious	quiet
imperative	impassioned	compassionate
critical	angry	absurd

Is the attitude consistent or does it shift? Where and why?

How is this relationship expressed or established?

In particular, what does the author's language suggest about the relationship in terms of degree of familiarity?

VII. How does the style contribute to the effectiveness of the work?

What is rhetorically significant about the syntax? Specifically, how do key syntactic choices relate to the purpose(s) of the work?

Consider qualitative factors (e.g., saliency) as well as quantitative factors (e.g., frequencies, proportions).

Sentence length

Types of sentences

Grammatical (according to function)

interrogative	declarative
imperative	exclamatory

Grammatical (according to structure)

simple compound

compound compound-complex

Amount, type and placement of subordinates

Rhetorical: loose/cumulative, balanced, periodic

Sentence openers

Personal versus neuter subjects

Active versus passive verbs

Order of elements

word order

interrupters

Phrasal construction

Schemes (especially those involving parallel structure) word order

Punctuation

What is rhetorically significant about the diction? Specifically, how do key word choices relate to the purpose(s) of the work?

Consider qualitative factors (e.g., saliency) as well as quantitative factors (e.g., frequencies, proportions).

Amount of words

total number of different words

amount of linguistic repetition, especially of key words

relation between number of words and development of subject; on a continuum from most expanded to most concise, where does the wording tend to cluster?

Grammatical function

proportion of nouns, including noun adjuncts

nominal versus verbal style

proportion of personal pronouns

proportion of verbs, especially finite verbs

proportion of adjectives

proportion of adverbs, especially those modifying adjectives

Word length

proportion of monosyllables

proportion of words of three or more syllables

Etymology

proportion of native versus borrowed words (especially Romance and Latinate words)

Scope/Status

proportion of words belonging to the common core of the language versus those marking a specialized context

regional or social dialect

medium subject matter/register

attitude/formality

Currency: On a continuum from vogue words to rarely used words, where do the words seem to cluster? Are there significant exceptions?

Function/ Associations: On a continuum from primarily denotative use to primarily connotative use, where do the words tend to cluster? Are there departures?

Abstractness: On a continuum from most abstract to most concrete, where do the words tend to cluster? Are there important departures?

Generality: On a continuum from most general to most specific, where do the words tend to cluster? Are there important departures?

Literalness: On a continuum from most literal to most figurative, where do the words tend to

cluster?

To what extent is literal imagery used?

To what extent are tropes used?

apostrophe	hyperbole	irony
metaphor	motonymy	onomatopoeia
parable	paradox	personifications
pun	simile	rhetorical question
symbol	synecdoche	understatement
zaugma		

What is rhetorically significant about the sound? Specifically, how do key choices involving sound relate to the purpose(s) of the work?

schemes (e.g., alliteration, assonance, rhyme)

rhythm